

Flight Scientist Report
Saturday 6/05/2021 ACTIVATE RF78

Flight Type: Statistical Survey Flight
Flight Route:

Special Notes: Was forecasted to have a lot of fog and potentially some clear patches to allow the Falcon to get into clear patches with the hope of getting underneath the clouds. But the day was such that the low clouds/fog stayed too low and Falcon couldnt get underneath. Good day for data above low cloud tops. Models disagreed on what the low cloud situation would be (same as what was observed Sunday June 6), emphasizing importance of our flights to help the models agree better. Some models showed no low cloud for instance on Sunday when there was in fact cloud.

King Air

Pilot report ():

Flight scientist report (Shingler): The King Air lost coincidence with HU25 on the way out due to ATC vectoring for reserved airspace. The UC12 ended up south of the track between ATLIC and ZIBUT on the way out. There was a decoupled aerosol layer in the W72 area between 4-6kft with the MBL mostly below 500 ft. Due to the ATC control issues, the King Air turned before the end point of the route (SHOKR), but roughly coincident with the HU25. There was a little bit of low-cloud/fog near the end of the route <500'. There was moderate cirrus above flight altitude seen along the track between ZIBUT and KLFI. Low level cloud/fog was seen around <300' near OUTES on the return trip. The decoupled aerosol layer was also seen between about 4-7 kft in the AR9 corridor on the return leg. Four sondes were dropped on the route today, just past ZIBUT going east, at the end point turn, just west of ZIBUT coming back, and near the coast. All systems were operational.

Falcon

Pilot report (Baxley):

Takeoff (Z): 1405 / Land: 1717

Science flight for the HU-25 in support of ACTIVATE Campaign #4, conducted cooperatively with the UC-12. Route of flight KFLI-ATLIC-ZIBUT-SHOKR-ZIBUT-ATLIC-KLFI (STOOG changed to SHOKR about 15 minutes into the flight). Departed Rwy26 with vectors to the north then east before direct to ATLIC, climbing to 5k ft MSL for initial transit, then descending to 500' MSL approximately 15 nautical miles east of KLFI. Winds were light (<15 kts) out of the west and north throughout the flight, with a thin cloud layer 300-400' MSL from ATLIC to 30 nmi east, and a thin cloud layer within 50 nmi of SHOKR. Mostly clear air modules were executed throughout flight. The UC-12 was required to deviate their flight path during the initial eastbound leg in W-387 to avoid other traffic, resulting in approximately 65 nmi separation

until SHOKR, then coordinated turns resulted in aircraft geolocation within 15 nmi throughout most of the flight. All objectives were achieved and with no discrepancies noted.

Pilots: Thorson/Baxley

QNCs: Crosbie/Winstead

Flight scientist report (Crosbie):

This flight was mostly conducted in the clear with a section close to the far turnpoint above fog/low stratus. The standard clear modules were adjusted to account for the fact that the MBL was very shallow and at 500ft MINALT, we were still in the inversion. It is possible that we were at/near the top of a shallow mixed layer that extended up to 400-600ft or it is also possible that it was stratified to levels even below our sampling altitude. We cannot say based on the constraint of 500ft as MINALT and this is a flight that would have benefitted from being able to sample nearer the surface. It is unlikely that changes in the clear air minimums would have allowed us to sample any cloud though since the cloud was optically thick enough that we could not easily see any ocean surface despite the tops being consistently lower than 500ft. Best estimate of the cloud tops was 300-400ft along our flight track. An interesting and consistent feature observed during this flight was a significantly enhanced ORG aerosol in the shallow surface layer (i.e. we observed it near our MINALT but less so above) and this was anti-correlated vertically with SO₄. SO₄ was less variable in magnitude between the layers but increased in the APBL/ACT environment. We conducted a few higher profiles at the far end and also on the return leg to investigate reported aerosol aloft. This flight is likely a good candidate for comparing aerosol optical properties with mass, size and composition data as well as making comparisons with the lidar data. (10 clear modules, but most legs were above the MBL)

Eddie:

Takeoff: 14:06:28

Landed: 17:16:50

Prior to takeoff, wet neph RH >97

After takeoff, wet neph RH dropped to operating range.

14:09:24 CPC & SMPS filter zero check; CPC 3776 reading around 70

14:11:04 CPC's back on ambient sampling

14:12:55 Nephs zeroed

14:20:38 @500 ft & scattering peaked @ 50. CPC 3776 reading less than cold CPC 3772

14:38:40 CPC & SMPS filter zero check; CPC 3776 reading around 100

15:08:08 CPC & SMPS filter zero check; CPC 3776 reading around 100

15:09:09 CPC's back on ambient sampling

15:29:00 @ 500 ft & just above top of cloud deck

16:46:30 – 16:47:00 CPC & SMPS filter zero check; CPC 3776 reading around 100

16:58:00 – 16:58:30 CPC & SMPS filter zero check; CPC 3776 reading around 100

17:12 Humidifier & WCM turned off in preparation for landing

Do Not Cite!

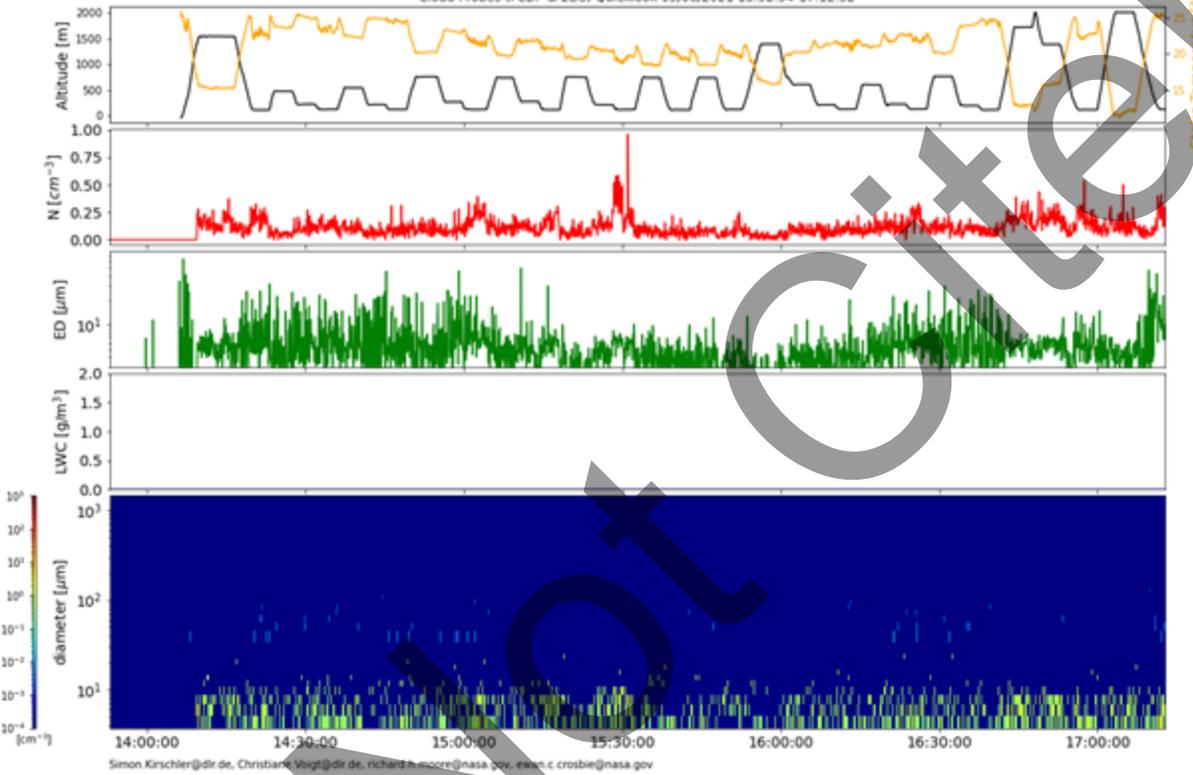
Quicklook ACTIVATE Cloud Probes (FCDP & 2DS) Quicklook

preliminary data, only for quicklook use

Simon Kirschler, Christiane Voigt, Richard Moore, Ewan Crosbie



Cloud Probes (FCDP & 2DS) Quicklook 05/06/2021 13:52-54-17:12:52

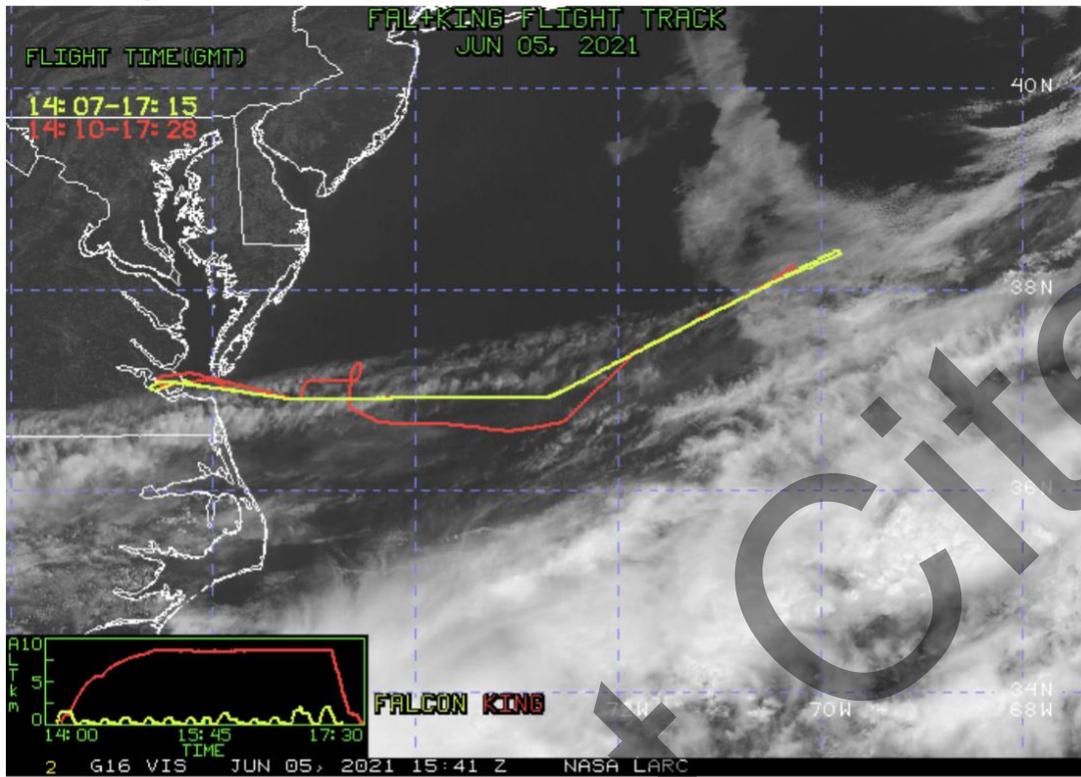


No clouds during flight

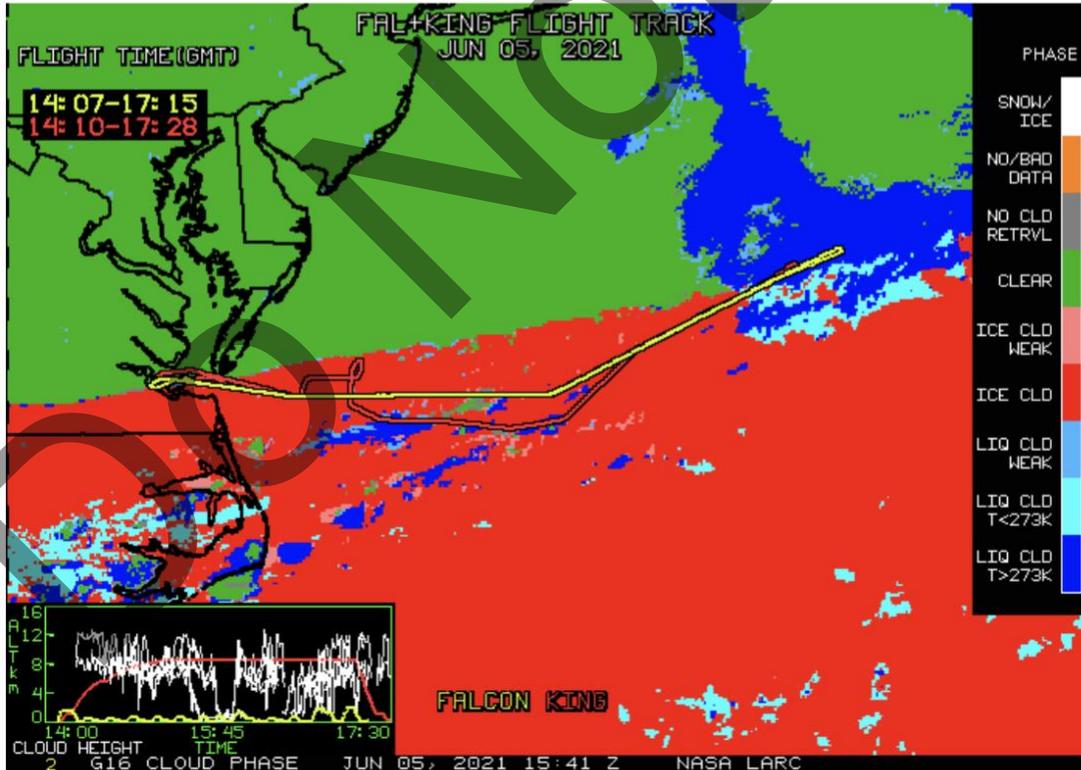
NASA-LaRC Clouds Group GOES-16 Quicklook Images for Flight 78, 15:41 UTC Jun 05, 2021

Do Not Cite!

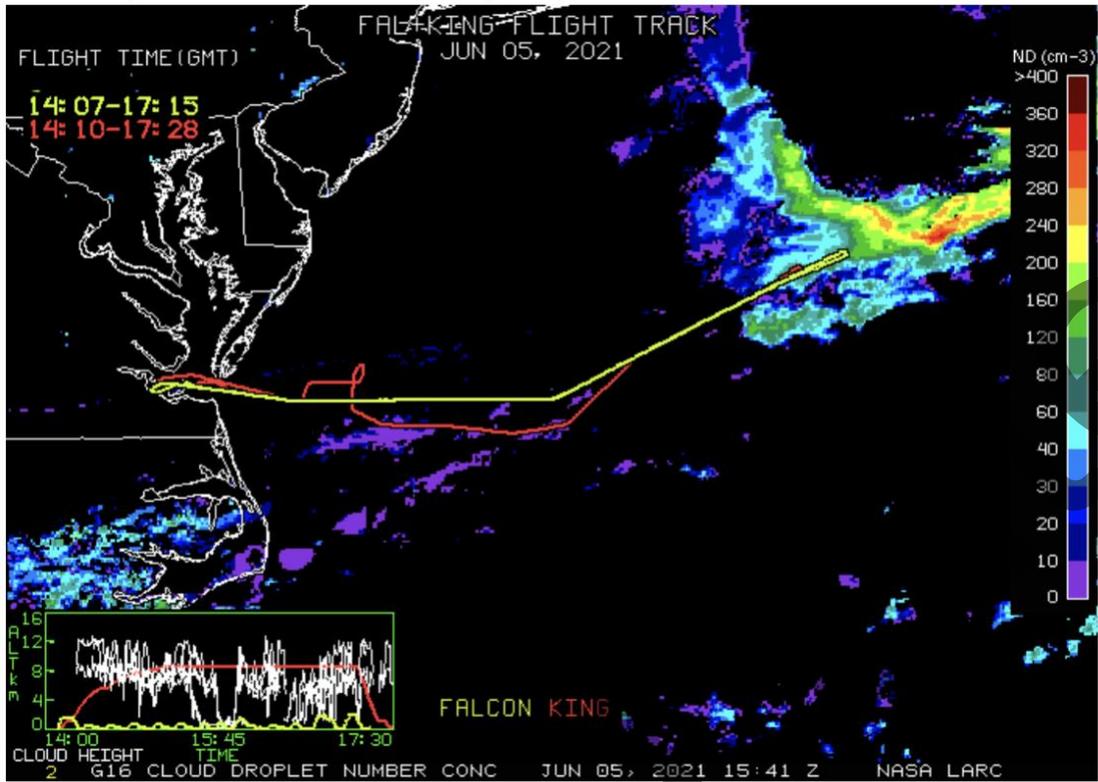
Visible Image



Cloud Phase



Cloud Droplet Number Concentration (cm⁻³)



Cloud-Top Height (Kft-ASL)

